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August 26, 1987

Mr. Warren Smull
Monsanto Company
500 Monsanto Avenue
Sauget, IL 62201

Dear Mr. Smull:

In accordance with your request, we have prepared the following responses to the IEPA/USEPA comments on the Geraghty & Miller, Inc. report regarding the Route 3 Drum Site at Monsanto's W.G. Krummrich facility in Sauget, Illinois. The agencies' comments appear in a May 21, 1987 letter to you. For convenience we have repeated the IEPA/USEPA comment and provided a response.

Cover Letter with Comments:

IEPA/USEPA Comment:

IEPA has prepared a listing of those comments as attached. IEPA has additionally prepared a Scope of Work to be used as guidance for a unique RI/FS for the Route 3 Drum Site. In return, it is the Agency's understanding that Geraghty & Miller, Inc. will submit through Monsanto a project schedule detailing proposed completion dates for RI/FS activities. A Scope of Work is attached.

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Response:

It was our understanding that as a result of the May 11, 1987 meeting, Geraghty & Miller, Inc. would further explain the remedial alternatives considered. We also indicated to IEPA that additional wells would be necessary to define the zone of ground-water contamination downgradient from the site. However, we did not agree to a full scale remedial investigation/feasibility study (RI/FS) as it is defined in CERCLA and SARA.

The expanded explanation of the remedial action alternatives and the additional wells would be done as part of the continuing environmental study at the site. While the site is not on the NPL and therefore there is no requirements for a formal RI/FS, Geraghty & Miller, Inc. will use the scope of work provided by IEPA to guide the study. Most of the tasks in the IEPA scope of work have already been addressed or have partially been completed. Tasks 1 and 2 are basically finished. Tasks 3 and 4 are partially complete and the additional work proposed will be designed to obtain the data required in Task 3b and 3d. The remaining subtasks in Task 3 have already been addressed.

Additional information will be provided to IEPA to meet the requirements of Task 4 (Endangerment Assessment), especially with respect to the plume definition and rate of con-

taminant travel. The expanded explanation of the process that was used to select the cap as the preferred remedial alternative should satisfy most of the requirements of Tasks 5 through 9 that have not already been completed.

General IEPA/USEPA Comment:

"The general conclusion of this joint review is that the assessment needs to be expanded. Downgradient and deep aquifer conditions are not adequately described. The study lacks historical background information and recommendations for remedial actions are far too narrow. Many possibilities for remedial action appear to have been unnecessarily discarded or not considered at all. Known contamination problems representing substantial risks to public health and environment are dismissed. The following comments support the aforementioned conclusions."

Response:

At the May 11, 1987 meeting in Chicago, Monsanto and Geraghty & Miller, Inc. agreed that the remedial action assessment would be further explained to IEPA and USEPA. We agreed that additional monitoring wells would be necessary to define the area of ground-water contamination downgradient from the Route 3 Drum Site and that these data would be used in some form of an endangerment assessment.

Geraghty & Miller, Inc. is not sure what the agencies mean by the "lack of historical background information" because the ground-water report entitled "Plant-Wide Assessment of Ground-Water Conditions at the W.G. Krummrich Plant, Monsanto Company, Sauget, Illinois" includes a detailed history of ground-water usage in the area. In addition, the Route 3 Drum Site report contains a description of the use and history of the Route 3 Drum Site itself.

Before recommending a cap for the Route 3 Drum Site, Geraghty & Miller, Inc. considered all of the technically feasible remedial action alternatives for this site. No feasible remedial action alternative was unnecessarily discarded. The only alternatives which were not considered in depth were rejected as being technically infeasible.

Geraghty & Miller, Inc. does not know what the IEPA and USEPA mean by "known contamination problems representing substantial risks to public health and the environment...". The only potential risk to human health is from exposure to contaminated ground water but there are no downgradient users of ground water between the Route 3 Drum Site and the Mississippi River which is the ultimate point of discharge for ground water on the Monsanto property. In the absence of a downgradient user ("potential receptors" in EPA's jargon) there is no risk to human health. We do not believe

that contaminants from the Route 3 Drum Site have reached the Mississippi River because our travel-time calculations indicate that contaminants could not have traveled more than 300 feet from the site. Our responses to specific comments below will further explain the contentions and assertions made above.

1. Concerning Ground-Water Flow Conditions

IEPA/USEPA Comment:

"The results of the subsurface exploration accomplished three obvious objectives--defined the depth and breadth of the trench; verified vertical migration of constituents to the ground water; and verified the lack of lateral migration to constituents above the ground water. The pollutant plume area affected by the drum site cannot be defined by completed borings or existing wells."

Response:

The agencies are correct in their assertions that the contaminant plume from the Route 3 Drum Area cannot be defined with the borings or existing wells. Therefore, Geraghty & Miller, Inc. has recommended the installation of four additional wells downgradient of the Route 3 Drum Site (see Figure 1). To confirm that contaminants are not mi-

grating vertically from the shallow zone into the intermediate zone, we recommend that one well be drilled into the intermediate zone at one of the locations.

The new wells should be drilled at various distances from the site but not more than 300 feet downgradient of it because our ground-water flow calculations have indicated that contaminants could not have traveled further than this distance. Data from IEPA wells EE-23 and EE-25 (which were drilled by Ecology and Environment as part of the Sauget site's RI/FS) are 600 feet and 1,350 feet downgradient of the site, respectively, and show no evidence of contamination. This supports our conclusion that contaminants from the the Route 3 Drum Site have not reached the Mississippi River. Split samples were collected from these wells by Geraghty & Miller, Inc. at the time the wells were sampled by IEPA, and the analytical data is attached (Tables 1 through 5). Figure 1 shows the suggested locations of the four proposed wells and also shows the location of the IEPA monitoring wells and a Geraghty & Miller, Inc. well (GM-23) which is also free of contamination.

IEPA/USEPA Comment:

"Much of the report deals with chemical analyses and the mobility of the constituents through the ground water. These relationships seem to indicate that contamination dis-

charge into the ground water will be extremely limited. However, this hypothesis has not been proven in the field. The soil between the trench and the ground water is very contaminated, as is the ground water in the immediate vicinity. The extent of the contamination downgradient cannot be defined with available data. The report's attempt to downgrade the intensity of the contamination is offset by the evidence of the complete disintegration of the drums by their contents in a "dry" (above the groundwater) environment. The "low" level of concentrations presumed to have developed over 40 years, may have occurred in a much shorter time period when the time of drum deterioration is taken into consideration."

Response:

We have already addressed the IEPA's concern that contamination downgradient cannot be defined with the available data. It should be noted that Geraghty & Miller, Inc.'s report did not "attempt to downgrade the intensity of contamination...". The calculations and estimates of contaminants loading to the ground-water system were based on water-quality results from well GM-31A, estimates of rainfall and infiltration and a knowledge of the history of the Route 3 Drum Site. The assumption that concentrations in the ground-water system have developed over a period of 40 years is correct because the boring program produced evidence of

bulk dumping. While the drums did deteriorate in the unsaturated zone because of chemical action in the soil, not all of the material appears to have been disposed of in drums. Therefore, the time of drum deterioration has little relevance in a consideration of the Route 3 Drum Site's impact on the ground-water system because contaminants have probably been entering the ground-water system since disposal began.

IEPA/USEPA Comment:

"The Stage Duration Curve showing the annual average Mississippi River State (1895 to 1974) is interesting. It reveals that the river's ground water has been recorded above the 400 foot elevation in the bottom of the Drum Trench, 1.5 percent of recorded time.

Information showing the number of years that the elevation of the river would be at 409 and above resulting in a plus 400 foot elevation in the trench for the following periods would be more appreciated.

- A) Data showing elevations from 1945 to present.
- B) Data showing elevations from 1961 to present while Industries ceased using ground-water pumping (1961-1980) and re-establishment of natural ground-water elevations.
- C) In November 1980 ground-water flow was toward to Mississippi River for the first time since prepumping. The last seven years should depict recent history. Geraghty & Miller, Inc. should show

"forecasted" elevation changes in S.W. elevations for the future years industrial developments and resulting increases on ground-water infiltration of the area."

Response:

We will supply IEPA with the stage data that were used to generate the stage duration curve. The data were obtained from the U.S. Army Corps of Engineers in St. Louis and were recorded with a water-level recorder at the Poplar Street Bridge. In case IEPA would like to review the individual measurements that were used to generate the stage-frequency curves, we will also obtain these data from the U.S. Army Corps of Engineers. However, the data base is voluminous and it will take some time to obtain.

It should be noted that responses of the water table to changes in river stage which occur now were not the same as in the past. A river stage of 409 feet above mean sea level now results in a water table elevation of 400 feet which is approximately the elevation of the bottom of the waste. Because of industrial pumping in the past, the water table was likely to have been much lower and river stages higher than 409 feet would have been necessary to drive the water table into the waste. The quantity and quality of ground-water level data collected prior to 1983 are simply not adequate to determine whether or not the water table rose above the bottom of the waste. However, in times past, the frequency

of inundation was almost certainly less than 1.5 percent of the time because pumping kept the water table at much lower elevations.

We are not quite sure what the agencies mean when they say "G&M should show forecasted elevations in S.W. elevations for the future years, industrial developments and resulting increasing on ground-water infiltration of the area." Stage duration curves are generated as a predictive tool. We have indicated that the water level is likely to rise above the bottom of the waste 1.5 percent of the time. This value means that there is a 1.5 percent chance in any year that the water level will rise above the bottom of the waste. Development in the future may reduce (below 1.5 percent) the probability that the water level will rise in the waste because additional paving will, in fact, reduce infiltration to the ground-water system tending to lower the water table. In addition, Ritchey, et. al. (1984), has indicated that pumpage may increase over the next two decades which means that the water table should actually be kept at a lower elevation than the present, if the increased pumpage does occur. In any event, the probability that water levels will rise into the waste will not exceed 1.5 percent of the time because the water table is at its highest elevation in decades as a result of the large reduction in pumpage in the immediate vicinity of the site.

2. Concerning Movement of the Chemicals Away
from the Drum Site

IEPA/USEPA Comment:

"Geraghty & Miller, Inc. claim that, by their estimation, the contaminants have not moved more than about 300 feet downgradient. Our position is that this in [sic] incorrect! In the first place, there has been no groundwater monitoring 300 feet downgradient (west) to prove or disprove this claim. In the second place, the nearest downgradient monitoring well, B-29, which is about 2,500 feet downgradient, has a mean concentration of priority and in the intermediate zone of 359,000 ug/l. A large proportion of these contaminants is phenol and dimethylphenol, which we could accept as being derived from facilities other than Monsanto's. However, there are also relatively large concentrations of chlorophenols, dichlorobenzenes, and nitrobenzenes, which we are fairly confident came solely from Monsanto's operations (either synthesis, use, or disposal at the Krummrich Plant). Finally, 2-nitrobenzenes and 4-nitrochlorobenzene were found in the tens to hundreds of thousands of ppb range in monitoring wells near B-29 (B-24 and B-25), and were reported as 124,000 ug/l total nitrochlorobenzenes for well B-29 (including 2-, 3-, and 4-nitrochlorobenzene). These compounds definitely came solely from Monsanto's operation and were among the compounds Monsanto originally wished to remove from the drum site at the beginning of this cleanup."

Response:

Geraghty & Miller, Inc.'s estimate of a 300-foot travel distance for the contaminants is based on the fact that the drum site has probably been contributing contaminants to the ground-water system for 40 years and that contaminants move conservatively in the shallow zone at a rate of 7 feet per year. A ground-water flow velocity is based on slug tests that were run on monitoring wells in the shallow zone and hydraulic gradients measured in the field. The only assumed parameter is the effective porosity which we believe is reasonable for the materials at the site. Our ground-water study indicates that contaminants from the Route 3 Drum Site are traveling downgradient in the shallow water bearing zone only, and that they are not migrating vertically into the intermediate zone where ground-water flow velocities are much greater than the shallow zone.

Besides GM-31A, which is less than 30 feet downgradient of the Route 3 Drum Site, the nearest downgradient monitoring well is not B-29 as the IEPA and EPA assert, but is EE-23 which was recently installed by the Illinois EPA's contractor, Ecology and Environment (see Figure 1). We have already discussed this well and the analytical data from a split sample taken by Geraghty & Miller, Inc. which shows that there is no evidence of contamination at this location.

This well is 600 feet downgradient from the Route 3 Drum Site (Tables 1 through 5). We did not analyze our sample for nitrochlorobenzenes and nitrobiphenyls because we were duplicating the list of parameters scheduled for analysis by Ecology and Environment, Inc. However, other more mobile compounds, such as phenol, are also not present in Well EE-23 at concentrations representative of contamination. In addition, other wells such as GM-23 and EE-25 (IEPA monitoring well), also show either no contamination or very low levels of contaminants. Both of these wells are also between the Route 3 Drum Site and the wells mentioned by the IEPA and USEPA (B-24, B-25 and B-29) as shown on Figure 1.

In any case, Wells B-24, B-25, and B-29 are all located in a landfill area, at a distance of 2,500 feet from the Route 3 Drum Site. The high levels of organic compounds found in ground-water samples from these wells have little to do with contaminants from the Route 3 Drum Site. In addition, contaminant concentrations generally decrease with distance away from the source. It is very difficult to imagine how the concentrations that were found at well GM-31A immediately downgradient from the Route 3 Drum Site could be responsible for the hundreds of parts per million in the B-series wells in the landfill areas. For this to occur, concentrations would have had to increase more than an order of magnitude as the contaminants travel away from the site, a process which is virtually impossible.

3. Concerning the Proposed Remedial Alternative

IEPA/USEPA Comment:

"Geraghty & Miller, Inc.'s proposed remediation is to cap the drum site. To claim that preventing infiltration of rainfall will stop the migration of the contaminants is totally unrealistic, since it is obvious that the ground water is moving up and down in the drum site as well as through it (both east and west). Furthermore, the contamination has already moved away from the site and is now widespread. This remedy, even if it would have been adequate before the compounds had spread, is now too little and too late."

Response:

Geraghty & Miller, Inc.'s conclusion that a cap will reduce by 90 percent the infiltration of precipitation through the waste is not totally unrealistic. It is based on the concentrations of constituents in Well GM-31A, and a conservative estimate of infiltration. It is also not obvious that ground water is "...moving up and down in the drum site as well as through it (both east and west)." In fact, our report states the water table is in the waste less than 1.5 percent of the time which indicates that constituents enter the ground-water system primarily via the vertical mi-

gration of infiltration from the surface and not from the movement of ground water through the waste. The cap, therefore, will reduce dramatically the contaminant loading to the ground-water system. We have estimated that the contaminant loading to the system presently is 0.06 lbs per day and would be reduced to less than 0.01 lbs per day after the cap is installed.

IEPA/USEPA Comment:

"A routine ground-water monitoring program should be established to develop a data base for evaluation of long term changes in water quality and flow patterns in the area and should be managed as such."

Response:

Geraghty & Miller, Inc., on behalf of Monsanto, has been conducting a ground-water monitoring program at this site since 1983. Ground-water samples are being collected from selected wells on a semi-annual basis and this program is expected to continue indefinitely. We are also monitoring water levels in the unconsolidated aquifer with seven water level recorders on wells GM-1, GM-2, GM-3, GM-9A, GM-9B, GM-27B, and GM-27C. These recorders will also continue to operate indefinitely. We continue to obtain daily Mississippi River stage data from the Corps of Engineers on a

routine basis and the stage data is compared to the ground-water elevation data.

IEPA/USEPA Comment:

"Additional remedial measures must be considered. Geraghty & Miller, Inc. rule out incineration as a remedial measure for either site. They claim that incineration is too expensive and will expose the public to air pollutants. They claim that worker risk while excavating wastes or contaminated soil would be too high. Regulatory agencies at all levels of government, the public in many different areas, and many industries have found excavation and incineration to be the optimum remedial alternative as a final solution for cleaning-up contamination. It is difficult to understand how such a common and reliable remedial option becomes impossible when applied to this site. Geraghty & Miller, Inc. should substantiate claims that waste excavation is risky to workers' safety by performing an endangerment assessment."

Response:

In recommending a cap for the site, Geraghty & Miller, Inc. considered various alternatives before making the recommendation. We considered many factors including technical feasibility, ability to reduce the contaminant loading to

the ground-water system, potential risks to the local population, potential risks to workers involved in implementing the remedial alternatives, and the risks of transporting hazardous wastes to populations along transportation routes. Cost was a relatively minor factor in the review process.

Incineration is a common and reliable remedial option for eliminating chemical waste. However, the material from the Route 3 Drum Site is primarily soil which is difficult to incinerate and would have to be transported long distances to facilities licensed for that purpose. Geraghty & Miller, Inc. considered on-site incineration but recommended a cap for the site because the risk to human health and the environment of leaving the material in place is far less than excavation and on-site incineration. The only possible risk to human health from an in-place closure is from the ground-water system and the ground water is not presently being used for potable purposes downgradient of the site. In addition, ground-water development for potable purposes is not anticipated in the near future. Contaminants from the site will ultimately find their way into the Mississippi River but when contaminants do reach the river, the loading to the river will be very low, possibly undetectable.

Compared to the risks to human health and the environment from leaving the material in place, the risks to human health associated with excavation and incineration are far

greater because it is much more difficult to control airborne contaminants. Excavation (especially coupled with on-site incineration) will assure some exposure to both workers, the local population and possibly people along transportation routes whereas exposure during capping will be limited to workers while the first layer of soil is emplaced. Capping will virtually eliminate the risk of exposure to the local residents.

IEPA/USEPA Comment:

"The Superfund program has in the past used the 10^{-6} excess cancer risk level, when MCLs are not available, as the point of departure for selecting ground-water cleanup levels. It may be more appropriate to use the water quality criteria for just consumption of contaminated water, not contaminated water and organisms. This can be calculated. For carcinogenic compounds, the additive risk should be considered with an attempt to keep the additive excess cancer risk to less than 10^{-4} , in accordance with general USEPA policy."

Response:

In our ground-water study report, Geraghty & Miller, Inc. has already indicated that ground-water remediation is unnecessary even if it were feasible in the vicinity of the

Route 3 Drum Site. In general, the only practical way to remove contaminants from ground water is to construct a pumping and treating system. However, because the only contaminated ground water related to the drum site is in the shallow zone, where permeabilities are extremely low, ground-water cleanup by pumping in this zone is not as feasible as other alternatives.

There is no evidence that contaminants have migrated to the intermediate zone because well GM-31B does not contain the compounds found in GM-31A. It is possible to pump larger quantities of water from the intermediate zone, but Geraghty & Miller, Inc. has recommended against it because this would simply draw the shallow zone contaminants into the intermediate zone (where they now are not present) and could make the situation worse by introducing the possibility of faster contaminant travel within this more permeable zone. Even if ground-water cleanup was practicable, there is also no risk that anyone would be exposed to contaminated well water because there are no well-water users downgradient from the Route 3 Drum Site.

IEPA/USEPA Comment:

"Although more assessment of the ground-water contamination is necessary, the short-term emphasis should be to remediate contamination in the upper less transmissive

portion of the aquifer. By doing this, contaminant loading to the lower, more transmissive zones would be reduced, the additional ground-water assessment could be performed and a more comprehensive evaluation of source control actions could be performed. Also, the Corps of Engineers project could be evaluated in relation to any needed remedial action for the deeper portions of the aquifer."

Response:

We have already addressed the impracticability of remediating ground-water contamination in the shallow water-bearing zone. To repeat, there is no evidence that ground-water contaminants are migrating vertically in the vicinity of the Route 3 Drum Site and, therefore, there is no need to remediate the intermediate zone. We have already agreed that additional assessments are appropriate with respect to ground-water contamination in the vicinity of the Route 3 Drum Site (see above).

The May 21st letter from IEPA makes reference to a "Corps of Engineers Project"; however, we do not know what project the agencies are referring to. If possible, we would like to obtain a copy of the report.

IEPA/USEPA Comment:

"River stages affect both ground-water elevation and direction. High river levels can reverse ground-water flow direction and could raise the uppermost aquifer well into highly contaminated areas. This situation would complicate any containment scheme as a remedial measure."

Response:

While it is true that high river stages do effect ground-water levels in the aquifer and do temporarily reverse ground-water flow directions, the agencies' comment is irrelevant. We have already indicated that "a containment scheme" is unnecessary.

IEPA/USEPA Comment:

"Essentially the report's conclusion is that widespread contamination is currently unlikely and can be made even more so by construction of an impervious cap over the drum site. Even accepting the report's hypothesis as true, the recommended remedial action has a serious flaw. Once capped the site must be presumed to remain in a constant condition in perpetuity. Changes of the past 20 years have impacted regional surface and subsurface conditions significantly. Further changes can be expected to occur which may adversely

affect the drum site in terms of pollutant discharges. A broader feasibility study may find a remedial action more acceptable than allowing hazardous wastes to remain indefinitely sitting on a sand layer 3 feet above the ground-water surface."

Response:

We do not know what the agencies mean by "changes of the past 20 years have impacted regional surface and subsurface conditions significantly." While it is true that construction and excavation have resulted in changes to surface topography, there is no reason to expect such changes in the future will have an impact on the wastes remaining in the Route 3 Drum Site. Once it is capped the site will remain undisturbed and, in this condition, we can anticipate nothing which could "adversely affect the drum site in terms of pollutant discharges."

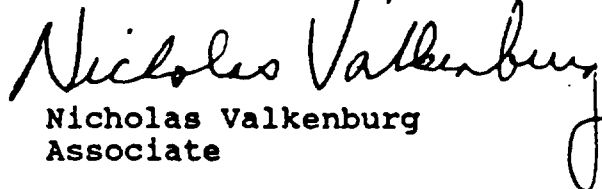
The development of ground water has significantly affected ground-water flow directions in the past. However, because ground-water pumpage has declined significantly over the past 20 years, ground-water levels are at their highest point in two decades and probably represent natural conditions when there was virtually no pumping in the area. Therefore it is difficult to see how ground-water levels could rise any higher than they are now. In any event,

water levels will be monitored after closure. If Ritchey, et. al., (1984) are correct, ground-water levels may actually decline as ground-water pumpage increases somewhat. This would further isolate the waste remaining in the Route 3 Drum Site from the ground-water system and would even further reduce the need for ground-water remediation.

Please do not hesitate to contact us if you have questions or if you require additional information.

Sincerely,

GERAGHTY & MILLER, INC.


Nicholas Valkenburg
Associate

NV:dv

REFERENCE

Ritchey, J.D., Schicht, R.J., and Weiss, L.S., 1984, Groundwater Level Analysis by Computer Modeling American Bottoms Groundwater Study; Prepared for the U.S. Army Corps of Engineers.

Table 1. Summary of Volatile Organic Compounds in Ground Water at Site 0, SSDRA, Sauget, Illinois.

Well Designation:	EE-23	EE-25	Field Blank	Trip Blank
Date:	3/24/87	3/24/87	3/24/87	3/24/87
USEPA Priority Pollutant				
Volatile Organic Compounds				
Concentrations are in ug/L				
acrolein	<100	<100	<100	<100
acrylonitrile	<100	<100	<100	<100
benzene	<4.4	<4.4	<4.4	<4.4
bis(chloromethyl) ether	<10	<10	<10	<10
bromoform	<4.7	<4.7	<4.7	<4.7
carbon tetrachloride	<2.8	<2.8	<2.8	<2.8
chlorobenzene	<6.0	<6.0	<6.0	<6.0
chlorodibromomethane	<3.1	<3.1	<3.1	<3.1
chloroethane	<10	<10	<10	<10
2-chloroethylvinyl ether	<10	<10	<10	<10
chloroform	<1.6	<1.6	6.55	<1.6
dichlorobromomethane	<2.2	<2.2	<2.2	<2.2
dichlorodifluoromethane	<10	<10	<10	<10
1,1-dichloroethane	<4.7	<4.7	<4.7	<4.7
1,2-dichloroethane	<2.8	<2.8	<2.8	<2.8
1,1-dichloroethylene	<2.8	<2.8	<2.8	<2.8
1,2-dichloropropane	<6.0	<6.0	<6.0	<6.0
cis-1,3-dichloropropylene	<5.0	<5.0	<5.0	<5.0
trans-1,3-dichloropropylene	<10	<10	<10	<10
ethylbenzene	<7.2	<7.2	<7.2	<7.2
ethyl bromide	<10	<10	<10	<10
ethyl chloride	<10	<10	<10	<10
ethylene chloride	<2.8	<2.8	<2.8	<2.8
1,1,2,2-tetrachloroethane	<6.9	<6.9	<6.9	<6.9
tetrachloroethylene	<4.1	<4.1	<4.1	<4.1
toluene	<6.0	<6.0	<6.0	<6.0
trans-1,2-dichloroethylene	<1.6	<1.6	<1.6	<1.6
1,1,1-trichloroethane	<3.8	<3.8	<3.8	<3.8
1,1,2-trichloroethane	<5.0	<5.0	<5.0	<5.0
trichloroethylene	<1.9	<1.9	<1.9	<1.9
trichlorofluoromethane	<10	<10	<10	<10
vinyl chloride	<10	<10	<10	<10
Sub Total 1	0	0	6.55	0

Non-Priority Pollutant
Volatile Organic Compounds

acetone	<10	<10	13.6	49.3
methyl ethyl ketone	<10	<10	<10	<10
carbon disulfide	<10	<10	<10	<10
vinyl acetate	<10.0	<10.0	<10.0	<10.0
2-hexanone	<10	<10	<10	<10
methyl-iso-butyl ketone	<10	<10	<10	<10
styrene	<10	<10	<10	<10
m-xylene	<10	<10	<10	<10
o- and p-xylenes	<10	<10	<10	<10

Sub Total 2 0 0 13.6 49.3

Total VOCs Analyzed 0 0 20.15 49.3

Table 2. Summary of Acid Extractable Compounds in Ground Water at Site 0, SSDRA, Sauget, Illinois.

			Field	Trip
Well Designation:	EE-23	EE-25	Blank	Blank
Date:	3/24/87	3/24/87	3/24/87	3/24/87

USEPA Priority Pollutant
 Acid Extractable
 Organic Compounds
 Concentrations are in ug/L

2-chlorophenol	<3.7	<3.3	<3.8	NA
2,4-dichlorophenol	<3	<2.7	<3.1	NA
2,4-diethylphenol	<3	<2.7	<3.1	NA
4,6-dinitro-o-cresol	<27	<24	<28	NA
2,4-dinitrophenol	<47	<42	<48	NA
2-nitrophenol	<4	<3.6	<4.1	NA
4-nitrophenol	<2.7	<2.4	<2.8	NA
p-chloro-a-cresol	<3.3	<3.0	11.8	NA
pentachlorophenol	<4	<3.6	<4.1	NA
phenol	1.75	<1.5	<1.7	NA
2,4,6-trichlorophenol	<3	<2.7	<3.1	NA
Sub Total 1	1.75	0	11.8	NA

Non-Priority Pollutant

Acid Extractable
 Organic Compounds

2-ethylphenol	<11	<10	<11	NA
4-ethylphenol	<11	<10	<11	NA
benzoic acid	<11	<10	<11	NA
2,4,5-trichlorophenol	<11	<10	<11	NA
Sub Total 1	0	0	0	NA
Total Acid Compounds Analyzed	1.75	0	11.8	NA

Table 3. Summary of Base/Neutral Extractable Organic Compounds in Ground Water at Site 0, SSDRA, Sauget, IL.

USEPA Priority Pollutant Base/Neutral Extractable Organic Compounds Concentrations are in ug/L	Well Designation:		Field	Trip
	EE-23	EE-25	Blank	Blank
	Date: 3/24/87	3/24/87	3/24/87	3/24/87
acenaphthene	<2.1	<2.2	<2.2	<2.1
acenaphthylene	<3.9	<4.0	<4.0	<3.9
anthracene	<2.1	<2.2	<2.2	<2.1
benzidine	<49	<51	<51	<49
benzo(a)anthracene	<8.7	<9.0	<9.0	<8.7
benzo(a)pyrene	<2.8	<2.9	<2.9	<2.8
benzo(b)fluoranthene	<11	<11	<11	<11
benzo(ghi)perylene	<4.6	<4.7	<4.7	<4.6
benzo(k)fluoranthene	<3.9	<4.0	<4.0	<3.9
bis(2-chloroethoxy)methane	<5.9	<6.1	<6.1	<5.9
bis(2-chloroethyl) ether	<6.3	<6.6	<6.6	<6.3
bis(2-chloroisopropyl) ether	<6.3	<6.6	<6.6	<6.3
bis(2-ethylhexyl) phthalate	<11	16.3	<11	<11
4-bromophenyl phenyl ether	<2.1	<2.2	<2.2	<2.1
butyl benzyl phthalate	<11	<11	<11	<11
2-chloronaphthalene	<2.1	<2.2	<2.2	<2.1
4-chlorophenyl phenyl ether	<4.7	<4.8	<4.8	<4.7
chrysene	<2.8	<2.9	<2.9	<2.8
dibenzo(a,h)anthracene	<11	<11	<11	<11
1,2-dichlorobenzene	<2.1	<2.2	<2.2	<2.1
1,3-dichlorobenzene	<2.1	<2.2	<2.2	<2.1
1,4-dichlorobenzene	<4.9	<5.1	<5.1	<4.9
3,3'-dichlorobenzidine	<18	<19	<19.5	<18.9
diethyl phthalate	<11	<11	<11	<11
dimethyl phthalate	<11	<11	<11	<11
di-n-butyl phthalate	<11	<11	<11	<11
2,4-dinitrotoluene	<6.3	<6.6	<6.6	<6.3
2,6-dinitrotoluene	<2.1	<2.2	<2.2	<2.1
di-n-octyl phthalate	<11	<11	<11	<11
1,2-diphenylhydrazine	<11	<11	<11	<11
fluoranthene	<2.4	<2.5	<2.5	<2.4
fluorene	<2.1	<2.2	<2.2	<2.1
hexachlorobenzene	<2.1	<2.2	<2.2	<2.1
hexachlorobutadiene	<1.0	<1.0	<1.0	<1.0
hexachlorocyclopentadiene	<11	<11	<11	<11
hexachloroethane	<1.8	<1.8	<1.8	<1.8
indeno(1,2,3-c,d)pyrene	<5.2	<5.4	<5.4	<5.2
isophorone	<2.4	<2.5	<2.5	<2.4
naphthalene	<1.8	<1.8	<1.8	<1.8
nitrobenzene	<2.1	<2.2	<2.2	<2.1
n-nitrosodiaethylamine	<11	<11	<11	<11
n-nitrosodi-n-propylamine	<11	<11	<11	<11
n-nitrosodiphenylamine	<2.1	<2.2	<2.2	<2.1
phenanthrene	<6.0	<6.2	<6.2	<6.0
pyrene	<2.1	<2.2	<2.2	<2.1
1,2,4-trichlorobenzene	<2.1	<2.2	<2.2	<2.1

Sub Total 1 0 16.3 0 0

Table 3. Continued.

	Well Designation:		Field	
	EE-23	EE-25	Blank	Blank
	Date: 3/24/87	3/24/87	3/24/87	3/24/87
Non-Priority Pollutant Base/Neutral Extractable Organic Compounds				
benzyl alcohol	<11	<11	<11	<11
aniline	<11	<11	<11	<11
4-chloroaniline	<11	<11	<11	<11
2-methylnaphthalene	<11	<11	<11	<11
2-nitroaniline	<11	<11	<11	<11
3-nitroaniline	<11	<11	<11	<11
dibenzofuran	<11	<11	<11	<11
4-nitroaniline	<11	<11	<11	<11
Sub Total 2	0	0	0	0
Total Base/Neutral Compounds Analyzed	0	16.3	0	0

1 - Replicate of EE-24.

Table 4. Summary of Pesticide/PCB Compounds in Ground Water at Site 0, SSDRA, Sauget, Illinois.

Well Designation: EE-23 EE-25 Field Blank Trip Blank
 Date: 3/24/87 3/24/87 3/24/87 3/24/87

USEPA Priority Pollutant
 Pesticide/PCB Compounds
 Concentrations are in ug/L

aldrin	<2.1	<2.2	<2.2	NA
alpha-BHC	<11	<11	<11	NA
beta-BHC	<4.9	<5.1	<5.1	NA
gamma-BHC	<11	<11	<11	NA
delta-BHC	<3.4	<3.6	<3.6	NA
chlordane	<11	<11	<11	NA
4,4'-DDT	<3.1	<3.2	<3.2	NA
4,4'-DDE	<6.2	<6.4	<6.4	NA
4,4'-DDD	<5.2	<5.4	<5.4	NA
dieldrin	<2.8	<2.9	<2.9	NA
endosulfan I	<11	<11	<11	NA
endosulfan II	<11	<11	<11	NA
endosulfan sulfate	<6.2	<6.4	<6.4	NA
endrin	<11	<11	<11	NA
endrin aldehyde	<11	<11	<11	NA
heptachlor	<2.1	<2.2	<2.2	NA
heptachlor epoxide	<2.4	<2.5	<2.5	NA
PCB-1016	<40	<41	<41	NA
PCB-1221	<40	<41	<41	NA
PCB-1232	<40	<41	<41	NA
PCB-1242	<40	<41	<41	NA
PCB-1248	<40	<41	<41	NA
PCB-1254	<40	<41	<41	NA
PCB-1260	<40	<41	<41	NA
toxaphene	<11	<11	<11	NA
Total Pesticide/PCB Compounds	0	0	0	NA

8 - Replicate of EE-24.

NA - Not analyzed.

Table 5. Summary of Metals and Miscellaneous Parameters in Ground Water at Site 0, SSDRA, Sauget, IL.

Well Designation:	Field		Trip	
	EE-23	EE-25	Blank	Blank
Date:	3/24/87	3/24/87	3/24/87	3/24/87
USEPA Priority Pollutant				
Metals (Concentrations are in ug/L, except where noted)				
antimony	<.089	<.089	<.089	NA
arsenic	0.024	<.050	<.010	NA
beryllium	<.00054	<.00054	<.00054	NA
cadmium	<.0031	<.0031	<.0031	NA
chromium	<.017	<.017	<.017	NA
copper	<.014	<.014	<.014	NA
lead	<.048	<.048	<.048	NA
mercury	<.00022	<.00022	<.00022	NA
nickel	<.0098	0.011	<.0098	NA
selenium	<.0050	<.010	<.0050	NA
silver	<.012	<.012	<.012	NA
thallium	<.0050	<.0050	<.0050	NA
zinc	<.020	<.020	<.020	NA
Non-Priority Pollutant Metals				
aluminum	<.099	<.099	<.099	NA
barium	0.17	0.12	<.0037	NA
cobalt	<.023	<.023	<.023	NA
tin	<.048	<.048	<.048	NA
vanadium	<.014	<.014	<.014	NA
boron	0.50	0.46	<.015	NA
iron	23.8	3.8	<.20	NA
manganese	1.58	2.35	0.0064	NA
Miscellaneous Parameters				
pH (units)	7.0	7.0	NA	NA
spec. conductance (umhos/cm)	1300	1400	NA	NA
temperature (deg. centigrade)	56	56	NA	NA
Total Cyanide	<.025	<.025	<.025	NA

1 - Replicate of EE-24.

NA - Not analyzed.



STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY

SHEIZ

TO:

DAVE FAVERO

DATE:

9-14-87

FROM THE DESK OF:

JEFF LARSON

RE:

SAUJET COMMENTS

- ☐ FOR YOUR APPROVAL
- ☐ TAKE NECESSARY ACTION
- ☐ APPROVED
- ☐ REPLY REQUESTED
- ☐ FOR YOUR COMMENTS

- ☒ FOR YOUR INFORMATION
- ☐ PER YOUR REQUEST
- ☐ SEE ME ABOUT ATTACHED
- ☐ PLEASE RETURN
- ☐ PLEASE CALL ME

COMMENTS:

THOUGHT YOU'D BE INTERESTED
IN THIS CORRESPONDENCE.